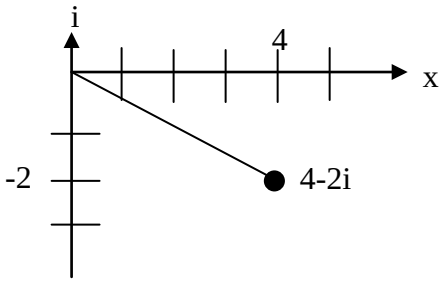
MODULUS

- The modulus of a complex number represents its distance from the origin on an Argand diagram.
- If a complex number is $z = a + bi$, then its modulus $|z|$ is $|z| = \sqrt{a^2 + b^2}$

Example: Calculate the modulus for $z = 4 - 2i$.



Answer: $|z| = \sqrt{4^2 + (-2)^2} = \sqrt{16 + 4} = \sqrt{20} = 4.472$

Example: Evaluate $|x - 2iy + y - 2ix|$.

Answer:
$$\begin{aligned} |x - 2iy + y - 2ix| &= |x + y - 2iy - 2ix| \\ &= |(x + y) + (-2y - 2x)i| \\ &= \sqrt{(x + y)^2 + (-2y - 2x)^2} \\ &= \sqrt{x^2 + 2xy + y^2 + 4y^2 + 8xy + 4x^2} \\ &= \sqrt{5x^2 + 10xy + 5y^2} \end{aligned}$$

Delta Ex 30.7 pg 282 – 283
Delta Ex 30.8 pg 283 (extension)